

Attachment 1

PROPOSAL FOR THE PIA NATURAL AREA RESERVE

February 2021

I EXECUTIVE SUMMARY

The *mauka* (upland) portion of Pia Valley, on the island of O‘ahu, is proposed for inclusion in the State of Hawai‘i Natural Area Reserve System (NARS). The proposed Pia NAR contains unique lowland mesic (moist) ecosystems in the leeward Ko‘olau mountains, and habitat for extremely rare plants and animals. Some plants and animals in the proposed Pia NAR are found nowhere else in the world. This parcel was generously donated to the Department of Land and Natural Resources by landowner Patricia Godfrey.

II INTRODUCTION (General)

This Reserve would include an area of approximately 300 acres of Pia Valley *mauka* of the Hawai‘i Loa and Niu Valley subdivisions up to the Ko‘olau crest in the Hawai‘i Kai region of O‘ahu, TMK 3-7-03:03 (Figure 1).

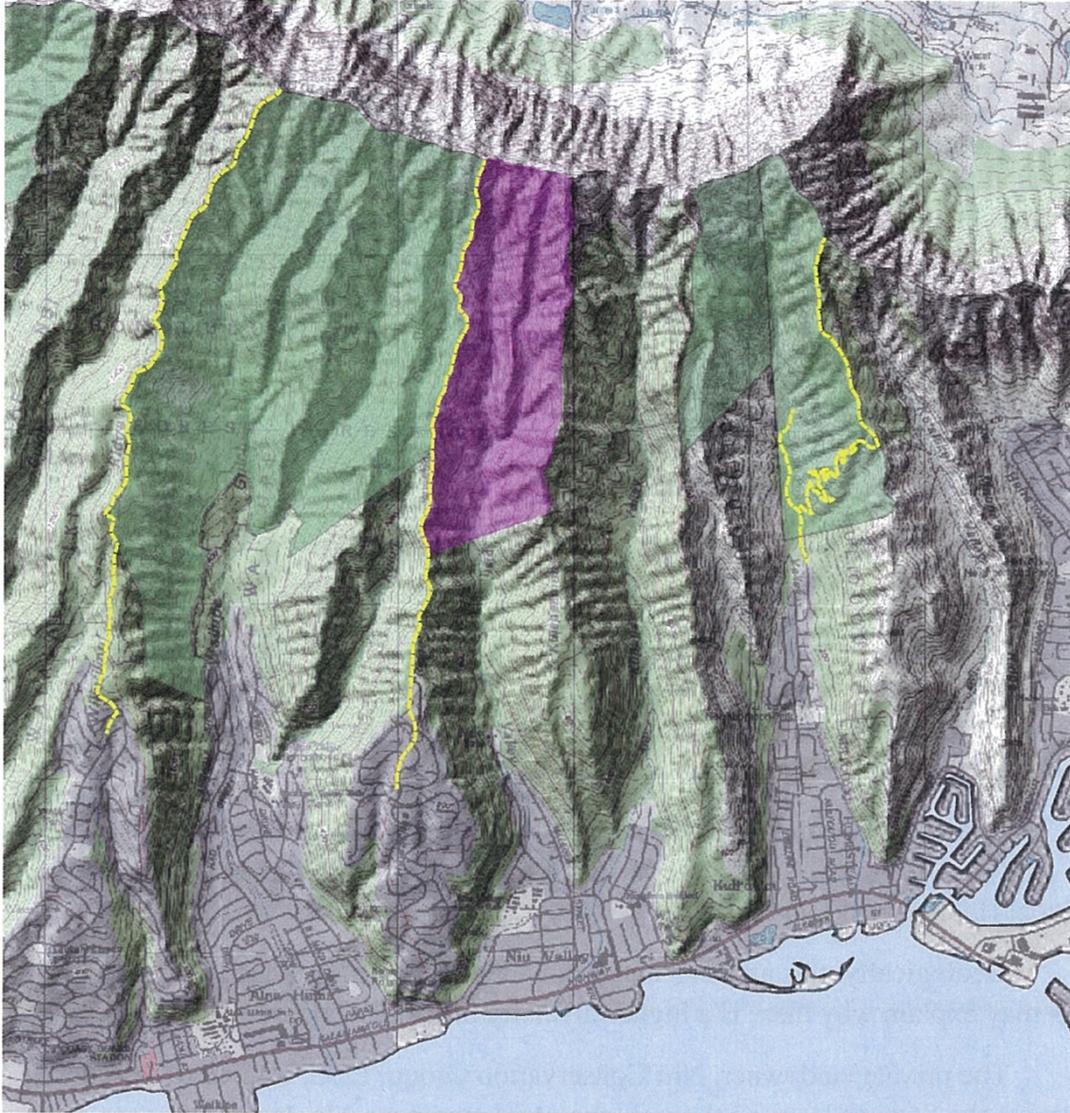
The proposed NAR contains ‘Ōhi‘a and uluhe-dominated forests (US Dept. of Interior, 2006; Figure 2). The inclusion of this area into the NARS would increase the representation of O‘ahu’s lowland mesic ecosystems.

There are records of 29 rare species found in the area or historically known from the area (see Appendix 1). The proposed Reserve falls within Federally-designated Critical Habitat for 17 species.

Geologically, this area is a hanging valley that is less eroded than nearby valleys.

This may explain why there is a higher diversity of native species and fewer weeds.

Proposed Pia Natural Area Reserve



Legend

- Na Ala Hele Trails
- TMK (1) 3-7-003-003
- LJ Forest Reserve

0 0.5 Miles



Figure 1: Map of proposed Pia Natural Area Reserve.



Figure 2: 'Ōhi'a and uluhe-dominated vegetation at the proposed Pia Natural Area Reserve.

III BACKGROUND AND HISTORY

Past Land Use, Previous Studies, and Conservation History

For the past few decades, the State has surveyed and collected genetic material from rare species within the proposed Pia NAR. The Division of Forestry and Wildlife (DOFAW) implemented 'Elepaio conservation work in Pia over 20 years ago. The Plant Extinction Prevention Program (PEPP) has been carrying out conservation work for 14 species in Pia for approximately ten years. The O'ahu DOFAW Branch Botanist has been collecting genetic material from five rare plant species in Pia. The Snail Extinction Prevention Program (SEPP) has been working with two endangered snail species that occur exclusively in Pia and surveying for two other endangered snail species that are historically known from the area. The last known wild individual of *Achatinella bulimoides* is known from the parcel.

No known aquatic surveys have occurred except for a damselfly survey in the lower reaches of the watershed in 1990. No damselflies were found during that survey (Polhemus, 2006).

Previous management strategies have identified Pia as the best place to fence in the southern Ko'olau mountains (O'ahu Army Natural Resources Program, 2008).

Currently there is no high elevation fence site in the southern Ko'olau mountains that can be used for out-planting and conservation of rare plants, 'Elepaio and snails.

Present Land Use and Access

This undeveloped area is in the Conservation District, Resource subzone. The western boundary of the property roughly follows the Hawai‘i Loa trail (Figure 3), managed by DOFAW’s Na Ala Hele system. Access to the trailhead is provided by the Hawai‘i Loa Ridge Owners Association. Designation of this area as a Natural Area Reserve is anticipated to benefit public access as this area would become public land.



Figure 3: View into the proposed Pia Natural Area Reserve from the Hawai‘i Loa trail.

Cultural/Recreational Uses

The Hawaiian meaning of Pia is "arrowroot, starch". The Department of Land and Natural Resources (DLNR) is not aware of any surveys of cultural or historical resources in this area. Outside of the proposed Pia NAR, the lowlands of Kuli‘ou‘ou and Niu contain remnants of terraces, bluff shelters near the coastline, fishponds, and burial caves, and the Kulepeamoia heiau (Sterling and Summers, 1978). Pia contains plants and animals that Hawaiians traditionally collect for practical, medicinal, decorative and spiritual uses (Gutmanis, 1979; Krohn, 1978). Some of these plants and animals are considered sacred to certain gods or because they are associated with cultural practices (Kanahela, 1986). Preservation of these species is essential to the continuation of traditional Hawaiian cultural practices.

The main recreational activity is hiking on the popular Hawai'i Loa Ridge trail. Adjacent to the western side of the property is a portion of the Honolulu Watershed Forest Reserve, part of hunting unit D, open to hunting from February to October for feral pigs and goats. Pia is not within a public hunting unit. The amount of poaching, if any, in this area is not known.

IV JUSTIFICATION (Specifics)

Scientific Value

Pia is a biodiversity hotspot and valuable as a location to study critically endangered species, as well as monitor efforts at species conservation.

Representativeness

Pia represents a mesic Ko'olau forest ecosystem. Hawai'i Revised Statutes Chapter 195 established the NARS "to preserve in perpetuity specific land and water areas which support communities, as relatively unmodified as possible, of the natural flora and fauna, as well as geological sites, of Hawai'i." Currently, no NARS exist in the southern Ko'olau mountains, nor in mesic Ko'olau ecosystems. Finally, the other NARS do not contain many of the rare species found in the proposed Pia NAR.

Natural Communities and their Status

Lower portions of the proposed Reserve have been invaded by *Psidium cattleianum* (Strawberry Guava), which thins out further *mauka* and is only occasionally seen as individual trees at the Ko'olau crest. *Clidemia hirta* (Koster's Curse) is also prevalent in the lower sections. Despite these major threats, as well as the threats posed by less established alien species, a relatively intact native ecosystem remains, especially in the *mauka* regions.

This parcel contains Priority 1 watershed forests, and services the water supplies of the Hawai'i Kai area (DLNR, 2011).

Rarity

Appendix 1 lists the 29 rare plant and wildlife species that have been recorded in the area. Many of these species are only found in Pia, such as *Achatinella Julgens* (Figure 4) and *A. fuscobasis* (Figure 5), two tree snail species, or the *Cyrtandra gracilis* shrub (Figure 6).

The only known O‘ahu population of *Asplenium dielerectum*, a fern (Figure 7), and the only Ko‘olau population of *Labordia cyrtandrae*, a flowering shrub, are found at Pia. Pia also contains the largest population of *Cyanea crispa*, a flowering shrub. The endangered O‘ahu ‘Elepaio bird also is known from this area (Figure 8).



Figure 4: *Achatinella fulgens* (Endangered)



Figure 5: *Achatinella fuscobasis* (Endangered)



Figure 6: *Cyrtandra gracilis* (Endangered)



Figure 7: *Asplenium dielerectum* (Endangered)



Figure 8: O‘ahu ‘Elepaio (Endangered)

Biological/Ecological Design

Designating upper Pia valley as a NAR would create a contiguous band of conservation land from Wiliwilinui ridge to Kuli'ou'ou ridge.

Location and Size

The western boundary of this 300-acre parcel follows the ridge separating Wailupe valley from Pia. The eastern boundary is Kulepeamo ridge, separating Pia from Kupaua valley. The north boundary is the Ko'olau summit crest, and the southern boundary terminates in a straight line at roughly 1200' elevation on the two ridgelines, dropping to 600' elevation at the stream.

Threats (Human/Biological)

High priority threats to Pia ecosystems are invasive plant species and feral pigs. Additionally, rats and predatory invertebrates such as the *Euglandina rosea* threaten the native snail species and native plants.

Present Level of Protection

This area is not within the Ko'olau Mountains Watershed Partnership, a voluntary alliance of landowners and land managers committed to the common value of protecting forested watersheds for water recharge, and other ecosystem services through collaborative management. If designated a NAR, the area would become part of this partnership, and benefit from landscape-scale conservation planning and management.

Long-term Ecological Viability/Environmental Consequences of No Action/Urgency

Designating this important section of lowland mesic forest a NAR would enhance the ability of the System to participate and contribute to conservation and restoration actions across the entire watershed.

As this area has already experienced native species extinctions, and contains many species that are in danger of extinction, it is projected that no management action would lead to eventual loss of additional species.

V. MANAGEMENT NEEDS

Threats Requiring Management

Management priorities include fencing to remove feral pigs, which trample and devour vegetation and spread the seeds of invasive weeds. Removal of invasive plant species is also a very high priority management action. Removing or reducing the amounts of predatory mammals and invertebrates, such as rats and the cannibal snail *Euglandia rosea*, is needed near the existing snail and rare plant populations. Small exclosures may be needed around remaining tree snails. Outplanting will preserve populations of very rare and endangered species. Infrastructure to support management may also be required, including helicopter landing zones, and monitoring equipment.

VI. PUBLIC SUPPORT

*Agencies, Organizations, and Individuals Contacted**

*Interested parties will be notified and a formal public hearing and comment period will occur for this nomination pursuant to Hawai'i Revised Statutes § 195-4 .

VII. BIBLIOGRAPHY /REFERENCES

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Appendix 1 - Rare Species of the Proposed Pia NAR and Vicinity

Type	Taxon	Known from area	Status	Organization /management	Critical Habitat
Snail	<i>Achatinella bulimoides</i>	X	Endangered	SEPP	
Snail	<i>Achatinella cestus*</i>		Endangered	SEPP	
Snail	<i>Achatinella ju/gens</i>	X	Endangered	SEPP	
Snail	<i>Achatinella fus cobasis</i>	X	Endangered	SEPP	
Snail	<i>Achatinella taeniolata*</i>		Endangered	SEPP	
Bird	<i>Chasiempis sandwichensis ibidis</i>	X	Endangered	DLNR-DOFAW/ OANRP	X
Plant	<i>Asplenium dielerectum</i>	X	Endangered	PEPP	
Plant	<i>Bonamea menzeisii</i>	X	Endangered	NEPM	X
Plant	<i>Cyanea acuminata</i>	X	Endangered	OANRP	
Plant	<i>Cyanea crispa</i>	X	Endangered	PEPP	X
Plant	<i>Cyanea grimseiana ssp. grimesiana</i>	X	Endangered	PEPP	X
Plant	<i>Cyanea humboldtiana</i>	X	Endangered	O‘a hu Branch Botanist	X
Plant	<i>Cyanea koolauensis</i>	X	Endangered	O‘ahu Branch Botanist/OANRP	X
Plant	<i>Cyanea superba ssp. regina</i>	X	Endangered	PEPP	X
Plant	<i>Cyrtandra gracilis</i>	X	Endangered	PEPP	
Plant	<i>Cyrtandra sessilis</i>	X	Endangered	PEPP	
Plant	<i>Deliss ea subcordata</i>	X	Endangered	PEPP	X
Plant	<i>Euphorbia arnottiana</i>	X	No Status		
Plant	<i>Eurya sandwicensis</i>	X	No Status	PEPP	
Plant	<i>Hesperomannia swezeyi</i>	X	Endangered	PEPP	
Plant	<i>Labordia cyrtandrae</i>	X	Endangered	PEPP	
Plant	<i>Lobelia monostachya</i>	X	Endangered	PEPP	X

Plant	<i>Myrsine fosbergii</i>	X	Endangered	O'ahu Branch Botanist	
Plant	<i>Nesoluma polynesicum</i>	X	No Status	ROI (Rare on Island)	
Plant	<i>Nothocestrum longifolium</i>	X	No Status	ROI	
Plant	<i>Polyscias gymnocarpa</i>	X	Endangered	O'ahu Branch Botanist	
Plant	<i>Polyscias lydgatei</i>	X	Endangered	PEPP	
Plant	<i>Platydesma comuta ssp. comuta</i>	X	Endangered	PEPP	
Plant	<i>Pteralyxia macrocarpa</i>	X	Endangered	O'ahu Branch Botanist	
Plant	<i>Sanicula purpurea</i>	X	Endangered	PEPP	
Plant	<i>Zanthoxylum oahuense</i>	X	Endangered	PEPP	
Plant	<i>Chamaesyce celastroides var. kaenana</i>		Endangered	NEPM	X
Plant	<i>Cyanea st.-johnii</i>		Endangered	NEPM	X
Plant	<i>Cyrtandra polyantha</i>		Endangered	NEPM	X
Plant	<i>Diellia erecta</i>		Endangered	NEPM	X
Plant	<i>Hedyotis coriacea</i>		Endangered	NEPM	X
Plant	<i>Isodendrion laurifolium</i>		Endangered	NEPM	X
Plant	<i>Lobelia oahuensis</i>		Endangered	NEPM	X
Plant	<i>Tetraplasandra gymnocarpa</i>		Endangered	NEPM	X

*Species only known historically, not found recently in area.

PEPP: Plant Extinction Prevention

Program SEPP: Snail Extinction

Prevention Program

O'ahu Branch: O'ahu Branch of the Division of Forestry and Wildlife

(DOFAW) NEPM: Native Ecosystem Protection and Management section of

DOFAW OANRP: O'ahu Army Natural Resources Program